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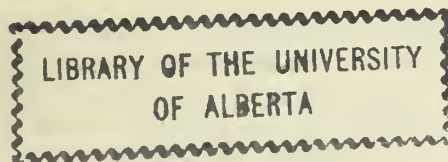
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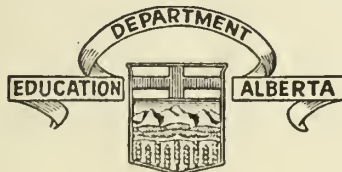
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Senior High School  
CURRICULUM GUIDE



DRAFTING 10 - 20  
AND  
SPECIAL SHOP DRAFTING OUTLINES  
FOR SHOP STUDENTS  
(Interim Edition, September, 1954)



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## FOREWORD

Drafting is a universal language. Man used drawings and sketches thousands of years before he learned to write. Indeed the first letters were simplified symbols. Sketching still ranks second to writing in the conveying of ideas and is much superior to writing when the idea or information is of a technical nature.

The Drafting 10 and 20 sequence is especially intended for students who are not taking a shop program. These courses may, however, where scheduling permits be used for enrichment of the shop program.

The Special Shop Drafting for Shop Students is a three year sequence of drafting which may be used in unit shop situations where the shop students do not take the drafting as a direct part of their shop course. In such centers the students may be instructed either by a drafting specialist or by one or more of the regular shop instructors. This sequence emphasizes the fundamentals and ensures that all shop students are instructed in mechanical drawing. The application to the particular shop situation may be done by the drafting instructor and/or shop instructor.



DRAFTING 10 and 20  
(3 credits each)

The social and economic background of drafting should be dealt with in group discussions.

The program aims to:

- (a) Provide exploratory experiences.
- (b) Develop basic skills.

The student should acquire, through problem solving, the ability to attain definite standards of achievement. It is suggested that the instructor employ a variety of teaching techniques. Instruction regarding the fundamentals and their application will then become more effective.

Neatness and accuracy should be insisted upon.

The following phases offer a wide variety of subject matter:

- (a) General drawing.
- (b) Blueprint reading.
- (c) Machine and sheet metal drawing.
- (d) Graphs and maps.
- (e) Architectural drawing.
- (f) Aircraft drawing.





1. Reading working drawings and blueprints.

2. Correct use of drafting equipment:

- (a) Correct positioning and attachment of paper to the drawing board.
- (b) Use of equipment - "Tee" square, set square, scales, compasses, etc.
- (c) Upper and lower case letters, figures and fractions. Balancing of titles and other lettering.
- (d) Lines, symbols and legends used in drafting.

3. Geometrical constructions:

Utilizing problems likely to be found useful in the practical application of drafting fundamentals.

Problems to be chosen from the following:

- (a) Bisection of a straight line.
- (b) Bisection of an angle.
- (c) Construction of a perpendicular line at a given point on another line.
- (d) Division of a line into any required number of parts.
- (e) Division of a line into proportional parts.
- (f) To construct a polygon of any required number of sides having one side given.
- (g) To inscribe a polygon within a given circle.
- (h) To inscribe a hexagon within a circle.
- (i) To inscribe a circle within a polygon.
- (j) To draw a circle through three given points.

4. Working Drawings:

Orthographic Drawing:

Two-view and three-view drawings.

- (a) Orthographic projection - - Fundamentals.
- (b) Application to simple models such as prisms, pyramids, irregular blocks, simple machine parts.
- (c) Rules of dimensioning.
- (d) Scale drawing in orthographic projection.

### Isometric Drawing:

- (a) Pictorial method of representation by isometric projection.
- (b) Fundamentals of isometric projection.
- (c) Specifications of isometric projection.
- (d) Application to a project requiring the use of isometric straight lines only.
- (e) Application to a project involving the use of circles or arcs of circles.

### Development of Simple Surfaces:

- (a) Stretchouts of prisms, cylinders, pyramids, cones.
- (b) Application to simple projects.

### Tracing and Blueprinting:

- (a) Tracings.
- (b) Technique of tracing.
- (c) Pencil and ink.
- (d) Tracing paper and tracing cloth (ink seldom used on paper in modern practice).
- (e) Blueprinting. Making blueprint paper. Procedures in blueprinting.

Note: Plates in orthographic and isometric projection should show a sampling from the following fields: Machine drawing, sheet metal drawing, graphs and maps.

### REFERENCE BOOKS

Fryklund and Kepler: GENERAL DRAFTING. McKnight & McKnight, Bloomington, Illinois.

Johnson and Newkirk: MODERN DRAFTING. MacMillan Company. This is recommended as the chief reference book.

Diamond, Thomas, A.: A PRIMER OF BLUEPRINT READING. Bruce Publishing Company. Milwaukee, U.S.A.

A high standard of attainment should be expected in Drafting 20. Approximately 20 plates should be completed.

1. General review of lines, symbols, dimensioning, drafting standard, methods and rules.
2. Geometrical constructions:

Problems on the ellipse:

- (a) Definitions of the ellipse.  
Methods of drawing accurate ellipses and approximate ellipses.

Examples:

1. Concentric circles method
2. Trammel method
3. Parallelogram method
4. Compass method

- (b) The helix.
- (c) The reversed or ogee curve.
- (d) The spiral (Archimedes').

3. Orthographic Plate of a more advanced nature involving use of a sectional view.
4. Isometric plate of a more advanced nature involving circles or arcs of circles.
5. Surface development and its practical application.
6. Cabinet drawing. Principles.
7. One-point perspective drawing.
8. Two-point perspective drawing.

#### Architectural Drafting:

- (a) The architect.
- (b) Letters and symbols used.
- (c) Plans and elevations.
- (d) Detailed drawings.
- (e) Specifications.

Aircraft Drafting:

- (a) Progress in aviation.
- (b) Construction materials.
- (c) Models.
- (d) Detailed drawing.
- (e) Assembly drawings.

REFERENCE BOOKS

Johnson and Newkirk: MODERN DRAFTING. Macmillan  
Company. New York.

## SPECIAL SHOP DRAFTING OUTLINES FOR SHOP STUDENTS

Two situations exist in Alberta insofar as shop drafting is concerned:

1. The shop instructor in woodwork gives the drafting instruction to his students as a related portion of their shopwork.
2. Groups of students are combined or otherwise given instruction in drafting either by a special drafting instructor or by various shop instructors as a separate portion of their course.

In the course outlines for all high school shop courses it is indicated that approximately 20% of the course time be allocated to drafting. This does not apply to the Arts and Crafts and the Printing students.



SHOP DRAFTING FOR GRADE X COURSES  
(FIRST YEAR STUDENTS)

A student taking one or more of Woodwork 10, Auto-motives 10, Electricity 10 or Metalwork 10 should, as a portion of his shop course, be given instruction and develop ability with the following:

1. Correct use of drafting equipment:

- (a) Correct positioning and attachment of paper to the drawing board; laying out border lines, titles, etc.
- (b) Use of the various pieces of equipment - "Tee" square, set squares, scales, compasses, pencils, etc; proper care and upkeep.
- (c) Upper and lower case letters, figures and fractions; correct forms; straight and sloping letters; balancing of titles and other lettering.
- (d) Lines, symbols and legends used in drafting.

2. Geometrical constructions, utilizing problems likely to be found useful in the work of the first year, and succeeding years.

Eight problems to be chosen from the following list:

- (1) Bisection of a straight line.
- (2) Bisection of an angle.
- (3) Erection of a perpendicular line at a given point on another line.
- (4) Division of a line into any required number of equal parts.
- (5) Division of a line into proportional parts.
- (6) To construct a polygon of any required number of sides, having one side given.
- (7) To inscribe a polygon of any number of sides within a given circle.
- (8) To inscribe a hexagon within a circle.
- (9) To inscribe a circle within a polygon of any required number of sides.
- (10) To draw a circle through 3 given points.
- (11) To draw a tangent to a circle from an external point.



### 3. Orthographic projection:

- (a) Fundamentals of orthographic projection in the third angle; names of the various views.
- (b) Application to simple models as prisms, pyramids, irregular blocks, wood joints, simple machine parts, etc.
- (c) Rules of dimensioning, practical applications to this, and succeeding plates.
- (d) Scale drawing in orthographic projection of bigger projects or models.

### 4. Pictorial method of representation by isometric projection:

Fore-note: The work of the first year will be restricted to plates involving use of isometric and nonisometric straight lines only.

- (a) Specifications of isometric projection; comparison with regular perspective drawing.
- (b) Application to a model or project requiring use of isometric straight lines only.
- (c) Application to a more complex model or project employing use of isometric, and non-isometric straight lines combined.
- (d) Conversion of an isometric drawing or view to orthographic projection of three views.

### 5. Pictorial method of representation by cabinet projection:

Fore-note: The work of the first year will be restricted to plates using straight lines; or straight lines, and circles or arcs in the undistorted front face.

- (a) Specifications of cabinet projection; comparison with ordinary perspective drawing.
- (b) Application to a model or project adhering to the limitations in the fore-note.
- (c) Comparison, using a suitable model or project, of two views - one employing the 30 degree oblique axis; the other using the 45 or 60 degree oblique axis (Model chosen for this plate should be suitable for showing clearly the advantages to be gained in certain cases by proper choice of angle for oblique axis).



6. Development of simple surfaces:

- (a) Stretchouts of prisms, cylinders, pyramids, cones, etc.
- (b) Applications to simple shop projects, such as funnels, measuring cups, trays, etc.

7. General application of the drafting course to actual shop projects of the first or second year, as time permits.

8. Pencil tracing of selected drawings.



SHOP DRAFTING FOR GRADE XI COURSES  
(SECOND YEAR STUDENTS)

A student taking one or more of Woodwork 20, Automotives 20, Electricity 20, or Metalwork 20 should, as a portion of his shop course, be given instruction and develop ability with the following:

1. General review of lettering, lines, symbols, dimensioning, drafting standards, methods and rules.
2. Geometrical constructions:  
Problems on the ellipse:
  - (a) Definitions of the ellipse; methods of drawing accurate and approximate ellipses; examples:
    - (1) Concentric circles method.
    - (2) Trammel method.
    - (3) Parallelogram method.
    - (4) Compass method, etc.
  - (b) Inscribing an approximate ellipse in an isometric, or oblique "square," example - ellipses in the isometric cube.

Additional geometrical constructions:

- (1) Rectification of the arc (laying a given arc of circle off a straight line).
  - (2) The helix, and a practical application.
  - (3) The reversed, or ogee curve.
  - (4) The spiral (Archimedes).
3. Advanced plate in orthographic projection, involving use of a sectional view.
4. Advanced plate in isometric projection, involving circles or arcs of circles. (Irregular curves may be included if required by project.)
5. Advanced plate in cabinet projection, required details in one, or both oblique faces.

6. Screw threads:

- (a) Profiles of thread forms, and their specifications (most widely used types to be selected).
- (b) Triangular diagram of proportions for American Standard bolt heads and nuts.
- (c) Drawing of a model or project requiring threads; example - Hexagon bolt and nut assembly.

7. Advanced development of surfaces with applications to practical sheet metal projects such as handscoop, tapered measures, stove pipe fittings, roof or chimney fittings, milk strainer, etc.

8. Development by triangulation with applications to transition pieces.

Special Note: Re 7 and 8 above; for non-metal students of the second year, if the time for this sheet metal drafting can, in the opinion of the drafting instructor, be spent to better advantage on work dealing more directly with the project matter of the student's elected shop, or shops, this shall be permissible.

9. General application of the drafting course to actual shop projects of the second or third year, as time permits.

10. Tracing; making Ozalid and/or Blueprints of one, or more selected plates.

SHOP DRAFTING FOR GRADE XII COURSES  
( THIRD YEAR STUDENTS)

Students entering upon the work of this final year of technical instruction have passed through two years of general drafting.

They should now be considered capable of applying these principles to most of the various problems and situations arising out of the different plates undertaken.

The year's work should approach, as closely as possible, practical drafting standards and requirements. Students should be capable of working largely on an individual basis at this stage.

1. Advanced working drawings based principally on the shop course in which the student is majoring; the following examples are given as suggestions only, and other satisfactory items might be substituted:
  - (a) Automotives - Working drawings of more difficult automotive parts such as crank shafts, gear and tooth nomenclature and construction, cams, differential parts, pistons with sectional view or views, steering gear parts, carburetor and fuel pump cross-sections, etc.
  - (b) Electricity - Working drawings of generator, motor, transformer, switchgear parts or assemblies, other electrical parts or units, armature winding diagrams, advanced radio circuits using standard symbols, electronic tube cross-sections, instrument constructions and circuits, switchboard circuit diagrams, etc.
  - (c) Metalwork - See Metalwork 30 course outline.
  - (d) Woodwork - See Woodwork 30 course outline.

REFERENCES

Abercrombie, T.F.: APPLIED ARCHITECTURAL DRAWING. Bruce Publishing Company.

Fryklund and Kelper: GENERAL DRAFTING. McKnight and McKnight Company.

Johnson and Newkirk: MODERN DRAFTING. Macmillan Company. New York.

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